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# PHILOSOPHICAL TRANSACTIONS.

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*Munday , July 3. 1665.*

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## The Contents.

*An Account, how Adits and Mines are wrought at Liege without Air-shafts, communicated by Sir Robert Moray. A way to break easily and speedily the hardest Rocks; imparted by the same Person, as he received it from Monsieur Du Son the Inventor. Observables upon a Monstrous Head. Observables in the Body of the Earl of Belcarres, sent out of Scotland. A Relation of the designed Progress to be made in the Breeding of Silkworms, and the Making of Silk, in France. Enquiries touching Agriculture, for Arable and Meadows.*

*An Account, how Adits & Mines are wrought at Liege without Air-shafts, communicated by Sir Robert Moray.*



It is well known to those conversant in Mines, that there is nothing of greater inconvenience in the working or driving, as they call it, of Mines or Adits under ground, for carrying away of Water, or such Minerals as the Mine affords, than the Damps, want, and impurity of Air, that oc-

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cur, when such *Adits* are wrought or driven inward upon a *Level*, or near it, 20, 30, or 40. fathom, more or less: Aswel because of the expence of money, as of time also, in the *Ordinary* way of preventing or remedying those inconveniences; which is, by letting down *shafts* from the *day* (as *Miners* speak) to meet with the *Adit*; by which means the Air hath liberty to play through the whole work, and so takes away bad vapours and furnishes good Air for Respiration. The Expence of which *shafts*, in regard of their vast depth, hardness of the Rock, drawing of water &c. doth sometimes equal, yea exceed the *ordinary* charge of the whole *Adit*.

Amongst the *Expedients* that have been devised to remedy this, there is one practised in the *Coal-mines*, near the Town of *Liege* (or *Luyck*) that seems preferable to all others for Efficacy, Ease, and Cheapness: the description whereof followeth.

At the mouth or entry of the *Adit* there is a structure raised of *Brick*, like a *Chimney*, some 28. or 30. foot high in all: at the bottom, two opposite sides are (or may be) some  $5\frac{1}{2}$  foot broad; and the other two, 5. foot: the wall 1' *Brick* thick. At the lower part of it, is a hole, some 9. or 10. inches square, for taking out of the Ashes, which when it is done, this Ash-hole is immediately stopt so close, as Air cannot possibly get in at any part of it. Then, some 3. foot above ground or more, there is on that side, that is next to the *Adit* or Pit, a square hole of 8. or 9. inches every way; by which the Air enters to make the Fire burn: Into this hole there is fixed a square *Tube* or *Pipe* of Wood, whereof the Joints and Chinks are so stopt with Parchment pasted or glewed upon them, that the Air can no where get in to the Pipe but at the end: And this Pipe is still lengthned, as the *Adit* or Pit advanceth, by fitting the new Pipes so, as one end is alwaies thrust into the other, and the Joints and Chinks still carefully cemented and stopt as before. So the Pipe or Tube being still carried on, as near as is necessary, to the wall or place, where fresh Air is requisite; the Fire within the Chimney doth still attract

(so to speak) Air through the Tube, without which it cannot burn, which yet it will do, as is obvious to conceive, (all Illustrations, and Philosophical Explications being here superfluous,) and so, while the Air is drawn by the fire from the farthest or most inward part of the *Mine* or *Adit*, fresh Air must needs come in from without, to supply the place of the other, which by its motion doth carry away with it all the vapors, that breath out of the ground; by which means the whole *Adit* will be alwaies filled with fresh Air, so that men will there breath as surely as abroad, and not only Candles burn, but Fire, when upon occasion there is use for it for breaking of the Rock.

Now that there may be no want of such fresh Air, the Fire must alwaies be kept burning in the Chimney, or at least as frequently as is necessary: For which purpose there must be two of the Iron Grates or Chimneys, that when any accident befalls the one, the other may be ready to be in its place, the Coals being first well kindled in it: but when the fire is near spent, the Chimney or Grate being haled up to the dore, is to be supplied with fresh fuel.

The Figure of the Fabrick, Chimney, and all the parts thereof being hereunto annexed, the rest will be easily understood.

### Figure 1.

*A.* The *Hole* for taking out the Ashes.

*B.* The *Square-hole*, into which the Tube or Pipe for conveying the Air is to be fixed.

*C.* The *Border* or *Ledge of Brick* or *Iron*, upon which the *Iron-grate* or *Cradle*, that holds the burning Coles, is to rest, the one being exactly fitted for the other.

*D.* The *Hole* where the *Cradle* is set.

*E.* The wooden *Tube*, through which the Air is conveyed towards the *Cradle*.

*F.* The *Dore*, by which the *Grate* and *Cradle* is let in, which is

to be set 8. or 10. foot higher than the Hole D. and the *Shutter* made of Iron, or Wood that will not shrink, that it may shut very close; this *Dore* being made large enough to receive the *Cradle* with ease.

G. The *Grate* or *Cradle*, which is narrower below than above, that the Ashes may the more easily fall, and the Air excite the Fire; the bottom being barred as the sides.

H. The *Border* or *Ledge* of the *Cradle*, that rests upon the *Ledge* C.

I. Four *Chains* of Iron fastned to the four corners of the *Cradle*, for taking of it up, and letting of it down.

K. The *Chain* of Iron, to which the other are fastned.

L. The *Pulley* of Iron or Brass, through which the *Chain* passeth.

M. A *Hook*, on which the end of the *Chain* is fastned by a *Ring*, the *Hook* fixed being placed in the side of the *Dore*.

N. A *Barr* of Iron in the Walls, to which the *Pulley* is fastned.

The higher the *Shaft* of the Chimney is, the Fire draws the Air the better. And this Invention may be made use of in the *Pits* or *Shafts*, that are *Perpendicular*, or any wise inclining towards it, when there is want of fresh Air at the bottom thereof, or any molestation by unwholsom Fumes or Vapours.

*A way to break easily and speedily the hardest Rocks, communicated by the same Person, as he received it from Monsieur Du Son, the Inventor.*

Though the Invention of breaking with ease, and dispatch, hard Rocks, may be useful on several occasions, the benefit is incomparably great, that may thereby accrue to those, who have *Adits* or Passages to cut through hard *Rocks*, for making passage for Water to run out by, in *Mines* of Lead, Tin, or any other whatsoever; these *Adits* appearing to be the surest, cheapest, and most advantagious way imaginable, for draining of the same.

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Fig: 1

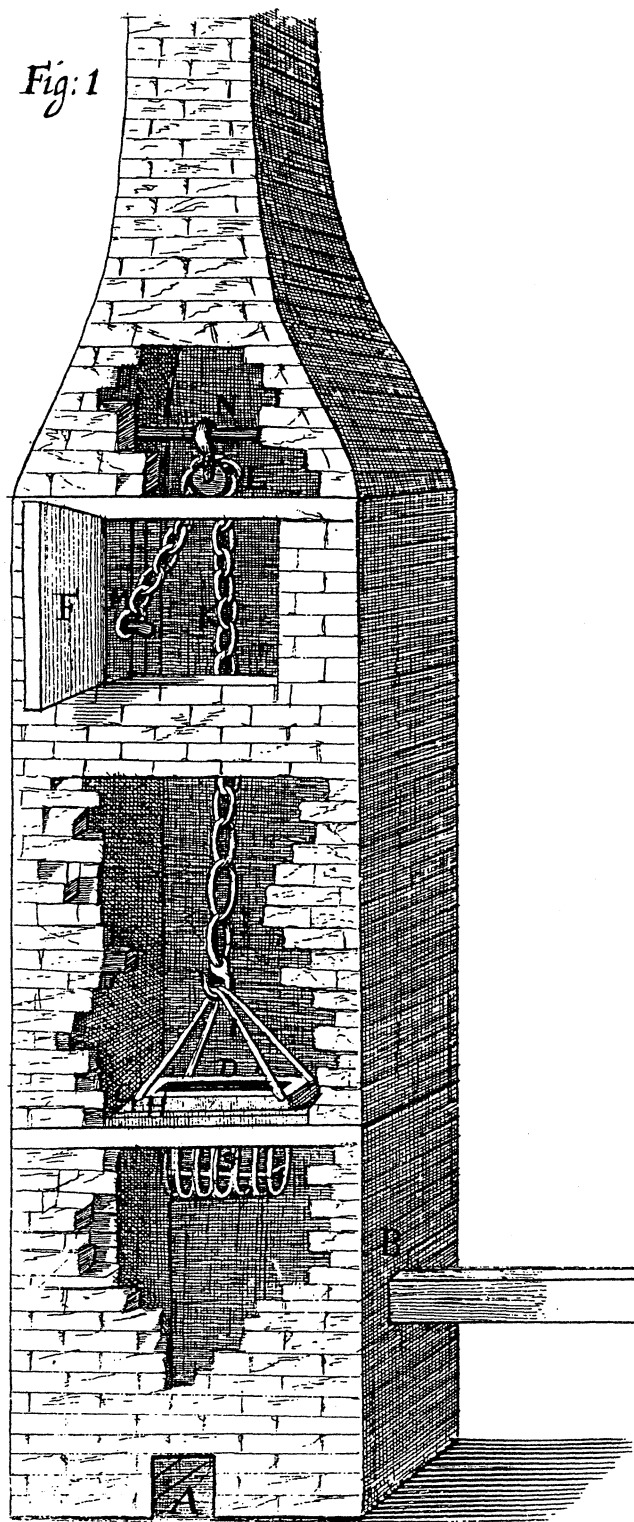


Fig: 2

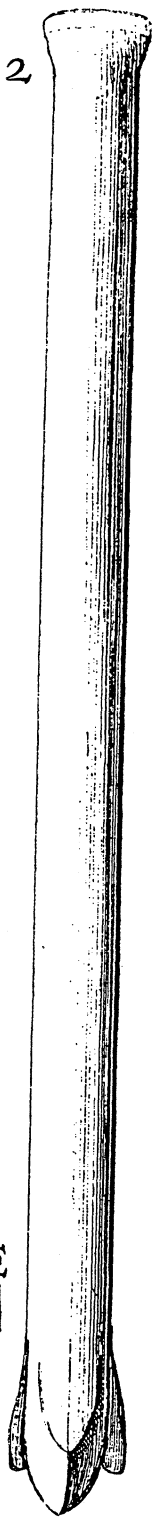


Fig: 3

